Claims:

1. A method for determining an effective thermal mass of a patient, said method comprising the steps of:

inducing hypothermia or hyperthermia in at least a selected portion of the patient with a device having a heat transfer surface, the surface being a metal or a balloon surface;

measuring power transferred between said device and the patient;

measuring a change in temperature over time which arises in the selected portion of the patient while performing the step of inducing hypothermia or hyperthermia; and

calculating an effective thermal mass based on the measured power and the measured temperature change over time.

2. The method of claim 1 wherein said selected portion of the patient is an organ.

3. The method of claim 1 wherein said selected portion of the patient is the whole body of the patient.

4. The method of claim 1 wherein said device having a heat transfer surface is a catheter and the step of inducing hypothermia or hyperthermia includes the step of introducing the catheter into a blood vessel supplying blood to the selected portion of the patient.

5. The method of claim 4 further comprising the step of circulating a working fluid through the catheter.

6. The method of claim 5 wherein the step of measuring the power transferred between the catheter and the patient includes the step of measuring a temperature differential between the working fluid as it enters the catheter and as it exits the catheter.

7. The method of claim 6 wherein the step of measuring the power transferred between the catheter and the patient further includes the step of measuring the power based on the measured temperature differential and a mass flow rate of the working fluid circulating through the catheter.

8. The method of claim 4 wherein the selected portion of the patient is the brain and the catheter is introduced into the carotid artery.

9. The method of claim 4 wherein the selected portion of the patient is the whole body and the catheter is introduced into the inferior vena cava.

10. The method of claim 5 wherein the feedback control system determines the temperature of the working fluid as it enters the catheter.

11. The method of claim 5 wherein the feedback control system determines a mass flow rate of the working fluid circulating through the catheter.

12. The method of claim 1 wherein the feedback control system employs a PID controller.

13. A method for controlling the temperature of at least a selected portion of a patient, said method comprising the steps of:

introducing a metal or balloon catheter into a blood vessel supplying blood to the

selected portion of the patient;

heating or cooling the catheter to introduce or remove heat from the selected portion of the patient, said heating or cooling being performed at a rate determined by a feedback control algorithm that employs a feedback control gain factor; and

wherein the step of heating or cooling includes the step of calculating an effective thermal mass for determining the feedback control gain factor, said calculating step including the steps of:

measuring power transferred between the catheter and the patient;

measuring a change in temperature over time which arises in the selected portion of the patient while heating or cooling the catheter; and

calculating the effective thermal mass based on the measured power and the measured temperature change over time.

14. The method of claim 13 wherein said selected portion of the patient is an organ.

15. The method of claim 13 wherein said selected portion of the patient is the whole body of the patient.

16. The method of claim 13 wherein the heating or cooling step includes the step of circulating a working fluid through the catheter.

17. The method of claim 16 wherein the step of measuring the power transferred between the catheter and the patient includes the step of measuring a temperature

differential between the working fluid as it enters the catheter and as it exits the catheter.

18. The method of claim 17 wherein the step of measuring the power transferred between the catheter and the patient further includes the step of measuring the power based on the measured temperature differential and a mass flow rate of the working fluid circulating through the catheter.

19. The method of step 14 wherein the selected portion of the patient is the brain and the catheter is introduced into the carotid artery.

20. The method of claim 13 wherein the feedback control algorithm determines the temperature of the working fluid as it enters the catheter.

21. The method of claim 13 wherein the feedback control algorithm determines a mass flow rate of the working fluid circulating through the catheter.

22. The method of claim 13 wherein the feedback control algorithm system employs a PID controller.